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ABSTRACT

This document contains three position papers concerned with copyright, cataloging, and software standards for educational software. In the first paper, "Cataloguing Educational Software: Is There a Problem?" R. N. Tucker advocates the cataloguing of educational software in the same way and in the same place as other materials in a library to provide potential users with access to all of the media that relate to their topics. In the second paper, "Copyright Implications in the Use of Software by Education," Geoff Crabb examines the provisions of the United Kingdom (UK) "Copyright Designs and Patents Act" as it relates to computer software and its application to educational use. In the third paper, "Computer Software--Some Management Issues," George Patton identifies issues involved in managing educational computer software at the national and institutional levels. (JLB)

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EDUCATIONAL SOFTWARE - SOME PROBLEMS OF COPYRIGHT CATALOGUING AND MANAGEMENT

A Set of three position papers from the
I.C.E.M. Sub-Committees on **Equipment and Management**
and **Information Technology**

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ICEM - June 1991

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Editorial

Recent contact with teachers and those involved in the development of software for education has shown that there is a concern for copyright, cataloguing and software standards.

These are seen as real problems by many. Whether they are or not may depend on particular circumstances, and will be governed by local law and practice. The authors of the following three papers were asked to express opinions on each of these matters. Whether or not they are right is not the point at issue. In some cases there may be no "right" answer. What is hoped by the ICEM Sub-Committees is that these pieces will give enough stimulus to debate in your own situation for you to arrive at conclusions which are right for you.

This topic arose from questions which were raised in the planning of the UNESCO/ ICEM Bordeaux course on the programming and managing of educational materials. It has since attracted interest from ICEM members in an informal survey carried out by E & M of what work the members wished to see going on.

It has relevance for organisation and managing of resource centres, and also for the customers in terms of easy reference information. The present discussion should be seen as an attempt to answer the three basic questions :

(a) **Is there a problem to be met at all ?**

(b) **Is there a problem now ?**

(c) **Will there be a problem in the reasonably near future ?**

Most members in developed countries and some in developing countries have gone or are going over heavily to work exploiting computers. The problems of classification, cataloguing, storage, retrieval, packaging and distribution of computer materials will be looming large with them at this time.

Computer programs may range from narrowly subject-based through broad topic approaches to "content-free" "generic" packages. Increasingly they are accompanied by overlay or support materials in a variety of media instead of or in addition to the original educational notes for teachers and technical documentation, in print form.

Standard classification schemes have always struggled with the problems of school "subjects" and "cross-subject" approaches.

Much experience has nevertheless accumulated through handling A/V materials. Is the problem of computer-disk material any different ?

At this stage thee must be very few titles in computer materials compared with those in other media, but the almost unimaginable storage capacity in new materials such as hypertext make it essential, if there is a problem, to grasp the nettle firmly now.

The Sub Committees see these papers as starters for discussion and debate. They may be copied or used at will for any educational purpose in any country so long as the purpose is non-profit-making. Responses from ICEM Members and Associates would be welcome.

No.1 Cataloguing educational software : Is there a problem ?

R.N. Tucker, NIAM, The Hague

Cataloguing and indexing resources in a library or a school resource centre has long been recognised as one of the key activities in the efficient running of such sources of information. It is not for nothing that a long-standing professional structure has developed round the training of librarians and information scientists.

If we see the learning resources in our schools as the carriers of information, then it is crucial that we have a system by which we can find ut just what information is contained within those resources. If we don't know what is in our resource collection we are unlikely to begin looking for something. And if we know that certain information is in the resources yet don't know where it is or how to get to it then we are unlikely to get what we want.

Most of us have grown up with access to a library - either in the school or nearby. Here books are organised into thematic groups under subjects and sometimes in age ranges. In most cases we can browse within a subject area to find what we want. It is however quicker to use a catalogue and search by whatever classification system is in use. In such a system knowledge is classified by a hierarchical order. By this, one is led from the general to the specific until one arrives at the particular area of knowledge that one is seeking.

It is not the place of this paper to plead the case for one or other system of classification. Those that have survived are fairly robust and serve their users well. It can be safely assumed that in any country there is a system of some sort to classify the contents of an item and a system of cataloguing which also embodies that classification.

To make this clear let us take the example of a book. The system of classification applies to the *content* of the book. Let us assume that it is a book about goats. Many a classification system will have a lengthy number which identifies the content within a hierarchy of knowledge - something like this :

Zoology
Mammals
Genus Species
Sub-species

Depending on how far one wants to take the number a greater or lesser degree of specificity can be achieved. Thus one can speculate that there would be a number for all books about domestic goats of a particular breed. Classification schemes also allow for the definition of place and time. Thus there might be a number for all books about this particular breed of goat in southern Norway in the winter. There then have to be rules about which aspect then takes precedence, and one enters the world of the professional librarian which is either a fascinating world of scientists or wise men debating the number of angels which might be placed on the head of a pin. It all depends where you stand.

At this point the reader might wonder what goats have got to do with the cataloguing of educational software. In this case the answer is - a great deal. When dealing with a book such a numbering system can give a highly accurate description of the contents. This is often far better than the title. In this case a title such as "Bergen Billies" would tell one very little, but a classification would ensure that the book could be found together with all the other books on goats. The raison d'être of classification is not to give a number to a book but to enable that book to be found accurately.

The same applies to educational software.

If one looks at the way in which teachers and learners ask for materials in a library one soon discovers that the majority start their enquiry with "Have you got anything on..." and then they name a subject. Naming a whole school subject, such as "Have you got anything on Chemistry ? " is not going to be very helpful to either the librarian or the inquirer since it is likely that there will be a great many titles on chemistry. Experience tells us that the more we can narrow the focus of our question to something like "Have you anything on the chemistry of molecular bonding in polymers ?" the more accurate an answer we are likely to get. In general we tend to ask for content first. Sometimes we couple this to a medium, such as asking for a book on elephants or a video about airplanes. This points to the fact that there is at least an intellectual separation between the content and the particular medium. When during the 1970's the lengthy process began to revise the Anglo-American Cataloguing Rules to cover all the then known media (AACR part 2), there was considerable debate about the classification and cataloguing of the different media. Whilst the librarians saw all media as carriers of content - and thus able to be handled under one set of rules - there were those in education who thought that (some of) the media were so different that they had to be handled in different ways. Malcolm Shifrin, one of the leading lights in the British media library movement, had a particular presentation which vividly demonstrated the elegance of the solution.

Beginning with a book he showed that it had a title, a contents page, pages of text, illustrations and an index. The book had physical dimensions which were noted under the medium designator "book". Taking the back off the book he then showed a loose-leaved pack with title, contents, text, illustrations and index. This time the medium designator was different. Postulating that the contents of the book could be presented with slides and text, he read on to tape, be filmed or be recorded on video, Shifrin presented a broad range of media. For each he laid on the table a catalogue card. On each the title was the same, the classification number was the same, the description of contents was the same. The one thing which was different each time was the description of the medium.

This demonstration was not wholly realistic in that changes from one medium to another often enforce considerable changes to content, but it makes the point very well that we don't have to invent new systems just because a new(er) medium arrives on the scene.

To come back to educational software. Is there really a problem ? Let us take the two aspects separately : classification and cataloguing.

There is every reason why educational software should be catalogued in the same way and in the same place as the rest of the learning materials in a school. Somebody searching under a subject is likely to profit from being able to access all the media which relate to that subject. If one is specifically seeking software then this should be easy eithin the catalogue. If the catalogue itself has been automated then it ought to be a simple matter to search on a specific medium and/or a subject area.

Software has usually got a title, author, publisher, date, indication of age level suitability. Within the existing cataloguing rules there should be no problem in describing the program in such a way that any potential user knows whether the software can be used on the available machines. One would for example need to know the size (and number) of the disc(s), the operating system (and issue where relevant), the amount of memory required and the extent of the program itself. It would also be necessary to know if the software was dependent on the user having another program (e.g. spreadsheet or word-processor), whether extra boards were required and whether any other peripherals were necessary. This sounds complicated but can be reduced to a single line on a catalogue entry.

The departure from many other records in a catalogue might arise when one looks at classification. Classification systems are designed to let the reader know what a particular item is *about*.. A lot of educational software falls neatly into known subject categories. A simulation of molecular movement in gasses can easily be classified. A program on airline reservation can be described and given a place in the system. The possible problem arises when one has to classify applications programs such as spreadsheets, word processors or databases. These are empty of content. They are not *about* anything.

On the other hand such programs have their equivalents in the world of books.Think of different types of reference works - dictionaries, encyclopædias etc. Library catalogues have long had the answer to these. Even a book containing logarithm tables can be classified although not necessarily under mathematics. By the same token a program designed to carry out a function on the computer independent of a particular content may not be at first easy to classify but should be possible. A discussion with your local librarian should provide an answer which will work for your situation. The important thing is that there should be consistency in whichever classification you choose.

No.2 Copyright implications in the use of software by education

Geoff Crabb, Rights Development Officer, NCET, London

Introduction

1. The issue of copyright and its relationship to computer software is extremely complex and has been the subject of numerous international conferences and countless published pronouncements. In a paper of this length only the main issues of copyright law and its application to educational use can be briefly explored.

   In essence the paper is a short resumé of the provisions of the UK "Copyright Designs and Patents Act 1988" as it relates to software.

Copyright law and software

2. In common with the development of other technological wonders (sound recordings, films, broadcasts etc), the introduction of the computer brought confusion and uncertainty to the closeted world of copyright. Copyright is traditionally concerned with works of the intellect, such as the written word, plays, music, painting and sculptures. However the protection against unauthorised use which, for centuries, has applied to these works has been claimed by the producers of photographs, sound recordings and films who claim, with justification, that their products are equally liable to unauthorised copying with equally detrimental effect on their business. Most countries have accepted the argument and extend protection to these new products.

3. Tested against the principle that copyright protection should be given to a product whose creation involves the expenditure of time, talent, money or creative thought and which is likely to be used by society in ways detrimental to the creator, computer software fits the bill. Software has some special characteristics of its own :

   i. perfect clone copies can be made simply and at a fraction of the price of purchase

   ii. usually if a copy is made it must be of the whole to be of any use

   iii. the only way it can be used is by copying it.

   In the last of these it is unique in copyright terms. Generally then, it is accepted that software must be protected and most states do so under copyright. Patent protection is rare except where the software in part of a process for which a patent is applicable.

4. Protecting software by copyright raises a number of issues. There can be no copyright in ideas or algorithms but only in the form in which the ideas are given material form. But should software be protected as a distinct and separate category of material or included in an existing form, such as a literary work, sound recording or film ? In the new legislation in the UK, coming into force in 1989, computer programs are protected as literary works. There is no mention in the new Act of the term "software". Including a maverick product like software in a traditional category like literary works requires a number of special provisions which apply to programs but not other literary works. In extending copyright to software there is a lot to be said for giving it a category all to itself and with its own appropriate rules and provisions.

5. Then there is the question of ownership since most legislations say who is to be the first owner of copyright. Usually this is the author or creator but this may not apply to sound recordings or films. In the UK, the first owner of these is the person making the arrangements for the making of them. If establishing the "author" of a program is not seen as a difficulty then, if protected as a literary work, the author will be the first owner. This might be subject, as in the UK, to the provision that where it is produced by an employee as part of the job the copyright will belong to the employer. In the UK there is also protection for computer-generated literary, dramatic, musical and artistic works, being those which are created in circumstances where there is no human author of the work, a phrase which the legislators may live to regret. In these cases, there being no "author" the first owner is the person who makes the arrangements for the creation of the work.

6. Copyright protection relies on there being originality in the sense of not being copied from existing material. Bearing in mind how much software relies on existing material, establishing that a program is original could be difficult. In Berne Convention countries there are no formalities or registration, protection being automatic from the moment of creation or production.

7. Next, the "restricted acts", being those acts which only the copyright owner may do or authorise and for which there is redress through the courts against those who infringe. Making a copy is the basic one and this would include any copy in the same form or in a different form. Software has to be copied to be used but the UK Act makes the loading of a program into a computer an act of copying and makes no mention that just using it is permitted. In practice, the supply of a program would carry an implied permission that it could be copied. Making an adaptation is another restricted act, including making a translation and for software changing the language or code into another language or code. In the UK this requires permission unless the adaptation is done merely in the running of a programme. Then there is the restricted act of "giving a public performance", not normally associated with software but as a literary work it applies in the UK. This means that the display of material on a VDU in the presence of the public would require consent. Other restricted acts would include publishing, broadcasting and inclusion in a cable programme service which would inhibit the use of software in on-line databases. The new UK Act also gives the copyright owner of a program the right to a royalty in respect of rental to the public.

8. As for the duration of copyright protection, in most countries this lasts until the death of the author and for 50 years thereafter. In the UK, this would apply to programs as with other literary material. There is something bizarre about a 50+ years protection for software but this is the price paid for including it along with other material, like a novel, where a long term is justified.

9. All copyright legislations include concessions to users, the type of use which would not be an infringement of copyright even where permission is not first obtained from the copyright owner. These include :

   i. for the purposes of reporting current events in newspapers,

   ii. for private study purposes,

   iii. for the benefit of teachers and pupils engaged in instruction.

   The extent of these concessions will have a profound effect on the value which education derives from resource material. As in the case of the new UK legislation, they can also influence the attitude of the rights owners and encourage them to be more positive in their attitude towards educational copying.

The statutory concessions required by education

10. The range of concessions which are of help to teaching and learning in relation to software include :

    a. The freedom to copy for private and domestic use, at least to the extent of making a single back-up copy.

    b. The freedom to copy and adapt for the purposes of research or private study. This is permitted in the UK under the "fair dealing" provisions.

    c. The freedom for educational users to make a back-up copy, to adapt for use on a different computer or to suit the needs of students. The freedom to network to other computers on the same site or within the same institution. These concessions may be restricted, for example, to schools only or educational establishments as defined. In the UK the new law does not permit this to be done but gives a broad permission to use in any way for examination purposes.

    d. The freedom to show or display software in the educational environment without this counting as a public performance.

    e. The freedom to include software in an on-line data service perhaps with limits as to the extent of the service.

    f. Where there is a rental right for software, an exclusion for libraries in educational establishments.

Contracts and licensing

11. Frequently software is supplied under a site or use licence which specifies the uses to which the material may be applied, e.g. only one back-up copy and for use on a specified computer. It may be assumed that if this licence, or some other arrangement, could be proved to be a contract then its provisions would be binding irrespective of the law of copyright. In other words, if the law permits one back-up copy to be made but the software is supplied on condition that no copies are made, copyright law cannot be invoked to cover copying.

12. Where the copyright law does not permit copying for educational use or not to the extent required, software producers, perhaps via a trade body, should be encouraged to issue standard forms of licensing for, especially, educational software. The move toward standard licensing removes from teachers the uncertainty which comes from a wide variety of licences from different producers. In passing, the UK Act uses the ploy of giving education the freedom to copy or record until such time as a licensing scheme is on offer at which point the freedom lapses. This "carrot and stick" arrangement encourages rights owners to negotiate licensing schemes. However, in the UK, the provision does not extend to the copying of software. An alternative is to impose a levy on blank tape or discs, the proceeds going to the producers, but the British government decided against this option.

13. There have been attempts to prevent copying by the inclusion of technical blocks or copycodes. These are likely to become more effective and common in future but are to be discouraged since they will inhibit the development of licensing schemes and further reduce the education value of software. The view should be encouraged that education may use software to suit its needs but should be prepared to pay for use which is not permitted under statute.

14. Finally, I have been asked to comment on three particular points. Where software is sold accompanied by a workbook or pack, there will be a separate copyright in the text, illustrations and perhaps in the typographical layout. This material is quite separate, in copyright terms, from the software, and statutory provisions may permit copying of the book but not the software or vice versa. In the UK for example a school may photocopy small parts of the book but not copy the program.

    Unlike a gramophone record, where the record and the music on it have their own protection there is no copyright protection for a floppy disc or program tape but only for the contents. The disc is the mere carrier of the program which, without the carrier, cannot be used.

    The third issue concerns the copyright implication where the use of a program is dependent on another system. Unless the national law permits this as part of, say, an educational concession, permission would be needed from the copyright owner of the second system if this has to be copied in order to run the program. To be brutal, producers should not offer, and users should not accept, material which requires the copyright in other material to be breached in order that it can be used.

No.3 Computer software - Some management issues

George Paton, SCET, Glasgow

1. General

There are many ways in which the problems of managing educational computer software for the new technologies are simply those of managing any media.

These should be considered at macro or national level **and** also at micro level, i.e. that of individual educational centres, organisations or institutions.

However there are also some specific aspects of these problems which apply to computer software in different ways from other media.

2. Management at macro or national level

(a) There are certain well-defined and agreed stages of managing at national level the supply of correct educational materials to the right schools at the right time.

These may be summarised as :

Planning : What type of software and equipment do we need in order to carry out educational curricular policies, probably decided at Ministry or Government level ?

Compatibility with existing hardware ?

What training may be required for teachers ? (Especially important in the case of new technologies).

Provision : What quantities are necessary to provide sufficient supplies to the agreed school population ? What educational policies exist to clarify this question ?

Production : What scheduling is required to ensure that the different elements in the package of materials are all ready in good time ?

Where computer software is produced at national level, this usually means the timing of meetings of teachers to write specifications for the curricular aims and content, the dovetailing of these with the work of professional programmers, and the allocation of time for appropriate field trials. (Some privately produced software materials do not pass through these stages.) It also means time for the writing and over-all production of educational and technical documentation, and support materials usually in print form. And yet again, time for the various stages of production of video materials or other A/V materials, especially in more complex software packages.

All-in-all this is a much more complex stage for computer software than for materials in other media. It may also be further complicated in those countries where there is a mixture of national, subsidised or government production, and also private manufacturing by independent producers.

Distribution : Appropriate packaging, to include floppy disk, educational documentation, teacher's notes, technical documentation, followed by usual methods of physical distribution.

Utilisation : Levels of usage. How much is the material actually used by teachers in schools ? When we begin also to ask "How well is it used ? " we move over into the stage of .....

Evaluation : This is not an essential management function, but most distributors and all educators will wish to know if/how the new materials improve the learning situation.

[Revision : In the light of experience and more recent advances in thought about the curriculum.]

(b) Most of these management stages are similar or even identical for all types of materials. Software carries its own problems, mainly at the stages of planning and production, as indicated. Once the materials reach the school, College or other learning institution, the problems take on new aspects.

3. Management at micro or institutional level

(a) Heads of institutions or departments will be much concerned with :

i. The need for training which is very likely to be needed for most teachers, especially at early stages of introducing new technologies into the school.

ii. Questions of compatibility. Often new materials will not run properly on older versions of the same machine for which they are designed.

iii. The educational and learning questions concerned with how best to make use of the vast stores of information now made available through databases or hyper-text materials.

iv. Questions of copyright, since teachers will wish to make copies of all materials both for their own use and for use by learners.

(b) Other questions at micro level may be set out as follows :

i. Acquisition and selection policies

New software presents no new management of resources problems not already familiar to librarians or organisers of resource centres. e.g. - What is the user group ? What use is intended for the materials ? Which areas of the curriculum should be targeted and in what order ? What is the appropriate apportioning of a total budget ? One key new factor is that such software must inevitably, unlike most other A/V materials, be subject to the limitations of present hardware and systems. This will also be true in industrial concerns or commercial companies. All new technologies have some inhibiting factors, and choices must be made - first in purchase of hardware, then in range of possible software, to exploit e.g. computers, Compact Disc technology, interactive technology, etc.

ii. Classification and cataloguing policies

The problems are dealt with in R.N. Tucker's article.The Anglo-American Catalogue Rules 2. (AACR2 of 1988) has a new section on Computer Software. Also the UK Library Association has issued simple and helpful guides on copyright for users in different kinds of institutions.

Computerised Catalogues can give more help to users, by providing more key words or indexing terms to help retrieve precise information. Different types of thesaurus have emerged in support of new materials, e.g. Open Learning materials in UK are classified not under the Dewey Decimal system but under "Using Learning Information - Superclass", a system devised for training materials. This has been one of the outcomes of work on standards devised for the development and structuring of databases carried out by the Association for Database Services in Education and Training (ADSET) for the UK Training Agency.

iii. Access and lending policies

Computer software and new technologies can create special problems of security, especially if there is open access and uninhibited lending of materials. Some major producer firms control this problem firmly, e.g. IBM have programmed materials to ensure that only 3 copies can be made. Licensing Agreements vary and must be studied carefully. Some will allow no loans at all. In Flexible Learning Centres where learners come to the Centre to use materials, this is not an issue. If borrowers can take materials away, the level of their own practical skills and their access to appropriate machine systems are serious questions which must be resolved. With the growth of individual learning at home, by a variety of open learning/flexible learning systems, this has become a real problem for schools, Colleges and public libraries.

iv. Physical organisation and access to materials

New software is often packaged or boxed by the manufacturer in ways which make it easy to go on display shelves alongside books in an integrated storage system. Multiple copies kept off display can also be stored easily. Earlier materials were not always packaged in this way and especial care had to be taken to ensure that all related materials could be easily identified and retrieved. Where materials are not shelved or stored in an integrated way there is need for an integrated catalogue to facilitate search. Playback facilities will have to be available for the A/V or electronic software materials. Planned integrated systems of such hardware can gradually extend the range of the software retrieval or playback facilities possible for users. In addition all documentation (educational and technical) must be readily available for easy browsing or detailed study.

Many institutions link Libraries and Computer Laboratories to help solve some of the problems here identified.

Post-Script

Nearly all the problems identified in these pages are common to all, but the solutions are limited by context and legal framework. ICEM members are invited to write to the Committees commenting on these brief essays or setting out solutions which they have found helpful in their own situations, or identifying different legal and institutional frameworks and the implications of these for managers, educators and educational technologists. ICEM members should pool their knowledge and experience in these matters, which are varied, complicated and intensely practical.